

**THE EFFECT OF PREPLANNING FOR FIRES IN BRISTOL'S MULTI-STORIED
HOUSING UNITS ON ELDERLY RESIDENTS.**

EXECUTIVE DEVELOPMENT

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ABSTRACT

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Fire in multi-storied buildings has always been a concern for the fire service. There is added concern when multi-storied buildings are used for housing elderly and possibly mentally impaired residents. The Bristol, Tennessee Fire Department, learning from the fatal Christmas Eve 1989 John Sevier fire in neighboring Johnson City, Tennessee, decided that they needed a plan to make sure the tragedy was not repeated in Bristol. In a joint effort with the Bristol, Tennessee Housing Authority, a comprehensive effort was put into effect to make the Edgemont Towers and Fort Shelby Apartments as fire safe as possible. The problem is that although there were extensive effort and funding to update the fire safety of these two buildings, the residents as a group still seemed to take an apathetic approach to their own safety.

The purpose of this research project is to compare the past area tragedy of the John Sevier Center fire and to use historical and descriptive research methodologies to answer the following questions:

1. What prompted the residents of Edgemont Towers and Fort Shelby Apartments to react or fail to react in the appropriate manor to a recent fire alarm?
2. Do the residents of Edgemont Towers and Fort Shelby Apartments believe that the Bristol, Tennessee Fire Department and the Bristol Housing Authority are trying to assure their safety?
3. Do the residents of Fort Shelby and Edgemont Towers understand the seriousness of a smoke-filled environment?

The procedures used to complete this research included a literature review of fire and rescue service journals and textbooks, as well as a survey of residents of both Bristol buildings.

The results of this research proved that there is respect for the efforts of the fire department and housing authority; however, the research identified that there are unacceptable percentages of residents that responded to the survey that still do not understand or who refuse to react positively in a fire emergency. Recommendations were made to continue the effort of evaluation of services and education of both residents and firefighting personnel to assure for a better product.

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INTRODUCTION

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Fire in multi-storied buildings has long been a concern for the fire service. An additional concern to the Bristol, Tennessee Fire Department is invalid and/or geriatric oriented apartments located in a multi-storied setting. Recent local events have proven costly in terms of property damage and lives lost in relation to the afore-mentioned. It is the responsibility of any executive officer in today's fire service to familiarize himself/herself with strategies to minimize fire losses, thus improving service quality.

The Housing Authority for the City of Bristol, Tennessee, along with the training division of the Bristol, Tennessee Fire Department recognized the potential for a fire emergency to have similar devastating results in the two public housing buildings located inside the Bristol, Tennessee city limits. Training involving practical evolutions was initiated by the fire department. Firefighters involved in the training effort made suggestions to the management of the housing authority in an effort to provide for as much fire safety as possible. The management quickly complied with the suggestions and an effort to maximize safety was placed into service. Among the suggestions from the firefighters is a suggestion that each room number be painted in fluorescent paint about 1 foot off the floor on each apartment doorway in every hall. Additionally, red fluorescent paint, including a red cross, is used to denote that the person in the apartment is invalid, or that the person or persons has some type of restriction that might hamper their successful escape in the event of a fire emergency. Likewise, room numbers and crosses are painted on the outside of each balcony or room landing so that firefighters operating aerial equipment can easily and readily maneuver the

equipment to the proper room. The Housing Authority compiled a list that is distributed to the fire department on a routine updating basis that lists each occupant and any additional concern. These lists are placed in the shift commander's vehicle for easy access in the event of a fire emergency. Fire drills are conducted on a routine basis with equipment involvement and fire simulation on at least a semi-annual basis.

The fire department developed a plan with the cooperation of housing authority staff and residents so that a specific meeting place and an in-house system of accountability are utilized. Each floor has a person specifically responsible for checking that each occupant of that floor is present at the predetermined sight and thus accounted for. While one of the buildings, Fort Shelby, was built with adequate sprinkler systems, the second building, Edgemont Towers, was retrofitted with a sprinkler system and a modern alarm system. The problem that prompted this research project was that although there were extensive effort and funding to update the fire safety of Fort Shelby and Edgemont Towers, the residents as a group still seemed to take an apathetic approach to their own safety.

The purpose of this research project is to compare a past area tragedy with Bristol and to answer the following three questions:

1. What prompted the residents of Edgemont Towers and Fort Shelby Apartments to react or fail to react in the appropriate manor to a recent fire alarm?

2. Do the residents of Edgemont Towers and Fort Shelby Apartments believe that the Bristol, Tennessee Fire Department and the Bristol Housing Authority are trying to assure their safety?
3. Do the residents of Fort Shelby and Edgemont Towers understand the seriousness of a smoke-filled environment in the event of a fire?

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BACKGROUND AND SIGNIFICANCE

On December 24, 1989, the Johnson City, Tennessee Fire Department responded to an automatic alarm at the John Sevier Center. Johnson City is a city of about 50, 000 people located about 20 miles to the south of Bristol, and together with Kingsport and Bristol make up the Tri-Cities Metropolitan area. Several pieces of fire equipment were returning to their stations when the alarm sounded.

The building was not sprinkled and the L-shape of the building made strategic placement of rescue equipment difficult. The Sevier Center, at the time of the fire was a residential housing unit that primarily housed elderly patrons. The building, which was originally built as a Hotel in the early 1900's, had apparently managed to escape most fire related codes. Additionally, the building was the site of many false alarms. While most firefighters were familiar with the building, this familiarity provided little advantage to the fire emergency that these firefighter.

First arriving units reported heavy smoke conditions. Early-in units, including police and EMS units, reported seeing elderly people looking out windows that were bellowing smoke.

Outside windows and walls of specific apartments were not marked as to room numbers, making identification of apartment units where rescue efforts were needed difficult to relate to inside crews. It is reported that one individual may have died because rescue units operating inside the structure could not properly identify the room she was calling from due to heavy smoke conditions (Scott, 1990). Conditions rapidly deteriorated and incident command was established.

The building size and occupancy accompanied by the heavy smoke visible caused supervisors to rapidly call for initiation of the incident command system. The outside temperature was 15 degrees Fahrenheit and self-contained breathing apparatus (SCBA) quickly froze. The call was put out to surrounding fire and rescue units that were available to respond, primarily to assist with supplying proper breathing air and relief to the firefighters. Fire units and rescue units from the area immediately responded and staging areas were set up. The cold was an obstacle not only for the active firefighters, but for arriving firefighters that were coming to the scene to provide rest for the initial responders. It was immediately apparent that the command post, a small car, was not large enough to be recognizable and that some type of staging area would be necessary to provide shelter from the cold. A basement of a large nearby church was later used; however, many agencies responding from outside Johnson City were unaware of its location.

Reports of heroics were plentiful on that Christmas eve night. More than once firefighters stacked ground ladders inside of aerial platform ladders to allow for extra reach. Inside attack crews, battling heavy smoke conditions in addition to the fire, were exposed to

heat intense enough to melt their fire helmets. These temperatures were reported to be between 1000 and 2000 degrees Fahrenheit (Scott, 1990). These efforts no doubt accounted for the saving of numerous lives.

When the fire was out and the final death toll was given, 16 people were dead. As written earlier, Bristol, Kingsport, and Johnson City form the Tri-Cities metropolitan region and the news of the tragedy rapidly spread. Determined to learn from the events of the Sevier fire, fire supervisors in Bristol decided to concentrate efforts to learn better safety procedures for the two similar type buildings located in their jurisdiction.

The two buildings that house similar residents to the John Sevier center that are located in Bristol are the Fort Shelby Apartments and the Edgemont Towers Apartments. The Edgemont Towers building, built in 1973, is a 10 story building originally built to house elderly patrons. The building was erected using funding from the United States Housing and Urban Renewal(HUD) grant monies. The building, originally not sprinkled, was retrofitted with a sprinkler system in 1996. It has 118 apartments that now house elderly patrons and indigent patrons. Some of these residents are possibly mentally impaired. The Fort Shelby Apartments, erected in 1980, is a turn-key, 10 story building that has 110 apartments. Fort Shelby is sprinkled in the main hall and common areas, is equipped with a fire pump, and like Edgemont Towers, was originally built by HUD to house elderly patrons and now houses elderly, indigent, and possibly mentally impaired patrons.

The Bristol, Tennessee Fire Department and the Bristol Housing Authority, determined that they would do all they could to prevent a tragedy similar to the John Sevier Center in the

city of Bristol. Semi-annual fire drills have been conducted since the fire and mutually concerned efforts were initiated. Firefighters learned that Edgemont Towers was totally electric and that Fort Shelby was electric except for a gas supplied boiler. They learned that Edgemont Towers has balconies at every room except the D apartment. Fort Shelby has balconies for every apartment. Practice rescues to these apartments revealed to firefighters that using the department's 1972 American LaFrance articulating boom 100 foot ladder platform, that the truck had to be taken down and repositioned three times to reach all apartments on one side of Edgemont Towers and two times to reach all apartments on one side of Fort Shelby. One side of Fort Shelby was virtually unreachable by this ladder for rescue purposes. Conversely, Ladder 3, a 1995 Pierce 100 foot telescoping ladder platform, could strategically locate, and move into a rescue position for any room on one side of each building. Firefighting and rescue teams learned that each apartment was equipped with heavy steel doors that would be very difficult to breach in a smoke-filled environment, so master keys were placed in the shift commander's vehicle, and firefighters were made aware.

Lieutenant Don Callahan, aware of the problems encountered by Johnson City firefighters, suggested to Bristol Housing Authority personnel that the doors be marked in fluorescent paint, including red paint and a cross for patrons that might not be ambulatory, or that might have some problem with escaping a fire emergency. He also suggested that each balcony be marked similarly, so that firefighters operating aerial equipment could focus on specific rooms quickly and more efficiently. The Housing Authority quickly complied and

went a step further by supplying the shift commander and training officer with a list of residents and possible problems on a quarterly basis.

Safe areas were designated outside each building and floor "monitors" were used to make sure that every resident was accounted for. Residents were instructed to get to the safe area quickly and safely. Residents that were not able to do this were instructed to go to a stairway and firefighters were instructed that clearing stairways was a number one priority, additionally, residents that were bedfast, were instructed to call 911 and to give their exact location. Residents were instructed that as they went down the stairways, their chances for survival increased.

In daytime emergencies, housing authority employees responded immediately for resident alarms or calls for help. Firefighters drilled repeatedly in both buildings with simulated fire and rescue situations. Both buildings have rooms with plug-in intercom type telephones that can be used for incident command. Commercial hosepacks were added to all front line pumpers, ladder trucks, and ambulances. Each drill was followed-up with a question and answer period with building residents and fire department command. Firefighters were trained in the National Fire Academy Incident Command classes titled Preparing for Incident Command and Commanding the Initial Response. Every drill was a chance for plan refinement.

The problem, however, presented itself when regardless of the preparation by the fire department and housing authority, some residents failed to respond accordingly or to take the drills seriously. This resulted in the need for this research.

LITERATURE REVIEW

Fire emergencies are a major concern in any building; however, multi-story coupled with geriatric or invalid patrons add other dimensions. While fire itself is a sufficient threat to any property, an internal fire attack in a multi-story building is difficult at best. The best defense against a major fire is a sprinkler system. Sprinkler systems are very effective and in 98 percent of all fires in sprinkled properties, the fire is extinguished with one or two heads (Doudy, 1998). Rapid extinguishment is necessary not only to minimize fire damage, but also to minimize smoke and hazardous vapor emissions. While many "pre-today" buildings were not required to have sprinkler systems, many others were retrofitted to meet today's fire safety standards. Because of concern on the part of Bristol Housing Authority, Edgemont Towers in Bristol is an example of the latter.

There are additional threats to safety simply associated with age. By age 75, the vital capacity of the lungs-the amount of air they can move with maximum inhalation and maximum exhalation-may be reduced by up to 50 percent (Werfel, 1998). The generation of smoke and gases from any fire situation may be more readily hazardous to the elderly by this simple fact. Other factors that should be considered in elderly residents are diminishing sight, hearing, mobility, and general health, as well as possible loss of some mental capacity. According to *American Journal of Public Health*, "In a very old population, dementia and cognitive impairment make the strongest contribution to both the development of long-term functional dependence and decline in function (1998)." Adding to the task of efficient response with

minimum injury also requires that the firefighters be familiar with the possibility of mental impairment with some of the building residents. With aging, the velocity of nerve conduction in the peripheral nervous system also decreases. This may lead to changes in motor or position sense and delays in reaction time and motor responses (Sanders, 1994). The command question of rapid extinguishment versus immediate rescue is better answered when the fire officer has a knowledge of his surroundings and the limitations of his environment.

As with any emergency situation, incident command is a major necessity. The incident command post should be readily available and should be easily visible to anyone needing to reach command. Command personnel, as well as line firefighters, must be familiar with the buildings interior and exterior. Some elements of the command system may have to be combined to allow for proper usage of what is many times limited human resources. This should not in any way deter from the main goal of life safety. Proper training will allow for a smoother flow of information and will allow incident commanders to better relate to information relayed from attack crews. If the incident commander is disciplined and follows a standardized process, the command process is simple and consistently the same for all types of incidents (Hawkins, 1998).

It is also very important that each responder be familiar with the in-place firefighting support that each building has to offer. Knowing stand pipe locations makes for a more rapid and more efficient placement of fire attack and rescue protection lines. Just the fact that the building is multi-storied will affect critical decisions. When deciding how to attack a high-rise fire, we must recognize that some normal firefighting procedures may not apply. There will be

a strong reliance on the building's systems. We may not be able to interact on the exterior due to the height of the fire (Smith, 1999). Knowledge of the firefighting fact that "In the 1990's, high-rise residence buildings throughout America have become less fire safe for occupants and firefighters" (Dunn, 1997) should make the desire to know their response capabilities and buildings of special hazard in their areas a must for all firefighters.

Firefighters should be armed with the knowledge of the fire building, the population, and the fact that nothing is forever, including a workable plan. Current knowledge that seems immutable may possess an inherent vice, and scientific inquiry may reveal the flaw and thus revolutionize, but not necessarily destroy, current thinking (Chambliss, 1988).

Literature Review Summary

The literature review provided insight into the fact that multi-storied buildings that primarily cater to the elderly present very specific fire and rescue hazards. Firefighters increase the chances for a safe and effective outcome in a fire emergency with proper knowledge of their surroundings, not just limited to the fire or rescue itself, but including occupant and structure specifics. The literature review documented that continuing to update data and applying the findings is a necessity.

PROCEDURES

A survey (see appendix A) was developed to determine resident opinions as to why they react or fail to react to specific factors. Prior meetings between the Bristol Fire Department training staff and the residents of Edgemont Towers and Fort Shelby apartments had several residents stating individual factors that affected them specifically. The purpose of this survey was to determine the majority opinion of those individuals that attended these meetings concerning their responsibility in a fire emergency. Additionally, the researcher intended to identify reasons for reactions to alarms and further to identify resident feelings as to the opinion of residents concerning fire department and housing authority direction and concern. The eight survey questions were intended by the researcher to supply necessary data to answer the three research questions stated earlier in this project.

The survey intended to identify three variables. Variable number 1 involved survey questions 1, 2, 4, and 6 and was used to ascertain the respondents opinion of the seriousness of a fire alarm. Variable number 2 involved survey questions 3, 5, and 7 and was intended to identify opinions related to the respondents attitude toward safety procedures introduced by the fire department and the housing authority. Variable number 3 involved survey question number 8 and was intended to identify the respondents knowledge of the major cause of fire related deaths.

There was a total of 90 residents present at two separate meetings between residents and fire and housing authority staff. Therefore, the maximum number of respondents to any question would be 90; however, not every resident answered every question for reasons unknown to the researcher.

Assumptions

The procedures used to complete this research project were based on the following assumptions. First, it is assumed that all literature in the literature review is from knowledgeable, objective, and unbiased authors. Second, it is assumed that all individuals that answered the survey questions answered honestly and sincerely.

Limitations

The limitations to this research project include the ability of individuals surveyed to interpret the questions accurately, the fact that data was collected only from residents that attended the meetings with the fire department, and the possibility that some respondents may have answered the questions based on what answers they presumed to be the best and not necessarily the correct answers, and additionally, that guests of apartment residents and who are not familiar with fire department plans are also at risk in a fire emergency.

As has been stated throughout this project the chances of dementia in the age group best represented by the majority of the respondents is marked. Additionally, some residents of both multi-storied apartment buildings may suffer from some degree of mental illness, not necessarily associated with age. The residents that responded to the survey were the attendants of two separate meetings with Bristol, Tennessee Fire Department and Bristol

Housing Authority management staff. While all residents were urged to attend, not all residents did so.

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The survey and corresponding results are limited to those individuals that attended one of these meetings. Residents were encouraged to answer the survey as truthfully as possible concerning their personal opinions. It is realized however, that some residents may have responded to what they knew the more appropriate answer to be in regard to their safety and not necessarily how they normally reacted to a fire alarm.

Also, as discussed in the background and significance section of this project, 16 lives were lost in the John Sevier Center fire. It is given that not all 16 lives lost were residents of the Sevier Center. As in this case previously stated, and any other case or any situation where visitors are allowed in any building, visitors that are probably not familiar with in-house fire plans are at risk in the event of a fire emergency.

RESULTS

1. What prompted the residents of Edgemont Towers and Fort Shelby apartments to react or fail to react in the appropriate manor?

Previous meetings with apartment residents presented with some residents saying that they were unable to properly hear fire alarms when they were sounded. Survey question number 1 asked the residents attending a recent meeting with fire department and housing authority personnel to rate their ability or inability to hear the alarm when sounded. There were 84 respondents to the question with 50% of the respondents saying that they always

heard the alarm and 49% saying that they did not. There was 1% of the respondents marking that they had no opinion as to whether or not they heard the alarm.

Additionally, residents were asked in survey question number 2 to respond to whether or not they assumed that the alarm was practice or an actual fire. There were 82 respondents with 23% marking that they always assume the alarm to be a drill. Conversely, 72% of the respondents marked that they did not assume the alarm to be a drill with 5% of the respondents marking that they had no opinion in regard to their assumption.

In survey question number 4, residents were asked to respond by agreeing or disagreeing as to whether they always leave the building when they hear an alarm. There were 85 respondents to the question with 69% agreeing that they always leave the building. There was an additional 26% that disagreed as to whether they left the building every time they heard an alarm and there was 5% that answered that they had no opinion in regard to this question.

Finally, in survey question number 6 respondents were asked to mark their feelings as to whether or not a fire was possible in either of the two stated buildings. There were 9% of those answering that marked that they did not believe that a true fire would happen at Fort Shelby or Edgemont Towers. There were 88% of those responding that believed a fire could happen at either building, with 3% of those surveyed marking that they had no opinion. There was a total of 90 responses to question number 6.

2. Do the residents of Edgemont Towers and Fort Shelby Apartments believe that the Bristol, Tennessee Fire Department and the Bristol Housing Authority are trying to assure their safety?

Residents were asked in survey question number 3 to address their feelings as to whether the fire department and housing authority had made a sincere effort to protect the residents in an emergency situation. There were 82 people answering the question with 96% agreeing that both agencies were trying to assure safety. There was a 2% response that disagreed in reference to the concern of both agencies and an additional 2% that answered that they had no opinion to this question.

In survey question number 5 residents were asked to respond to their belief as to whether the fire department would come and get them in the event of a real emergency. There were 82 responses with 45% marking their feelings that the fire department would come to their room and get them if there was a true fire emergency. Similarly, 48% marked that they did not believe that the fire department would come and get them and an additional 7% that marked that they had no opinion as to this situation.

Survey question number 7 asked respondents to mark their feelings as to their intentions to do everything they could to help themselves in a fire emergency. There were a total of 84 responses with 94% agreeing that they would do everything possible to help themselves. Only 5% of the respondents disagreed that they would try to help themselves and an additional 1% marking that they had no opinion to this question.

3. Do the residents of Fort Shelby and Edgemont Towers realize the seriousness of a smoke-filled environment in a fire emergency?

Survey question number 8 asked the residents responding if they felt that most fire deaths were from intense heat. There were 85 responses with 60% marking that they felt that most people died from the intense heat and 35% responding that they disagreed with the preceding statement and an additional 5% responding that they had no opinion in regard to this question.

DISCUSSION

There are many points to consider when trying to determine the effectiveness of any emergency plan. Some points may not be as obvious as others. A serious point of consideration, in relation to the two Bristol apartment buildings, is the fact that 49% of the survey respondents reported that they did not always hear the fire alarm. No matter how elaborate a rescue or firefighting system is, the basic need for realization that there is a problem is major and must be immediately recognized.

It is also very important that all agencies involved work together to collectively provide for everyone's safety. The cooperation between the fire service and the housing authority has been exemplary and has provided for a more effective emergency response. Hawkins (1998) writes that if the incident commander is disciplined and follows a standardized process, the command process is simple and consistently the same for all types of incidents. Constant drilling and updating generates standardization and provides the protected citizens some degree of comfort as documented by the survey results. It is very important that residents

have faith in the fire department's willingness to address their needs. As Dunn (1997) writes "high-rise residence buildings throughout America have become less fire safe for occupants and firefighters" emphasizing the importance that the fire service convey to the customer their willingness to do the job effectively. Additionally, as Chambliss (1988) so capably explains "knowledge that seems immutable may possess an inherent vice, and scientific inquiry may reveal the flaw and thus revolutionize, but not necessarily destroy, current thinking."

Perhaps equally important is the necessity for the target population to understand and effectively process the information that the fire department is trying to convey. Residents have repeatedly been told that limited resources may make it impossible to reach every room in a fire emergency; however, an unacceptable 45% continue to state that they believe that the fire department will come to their room and get them in the event of a real fire. It is a fact that a large segment of the residents could be considered elderly. As is pointed out by the *American Journal of Public Health*, dementia could be a factor in the residents inability to comprehend. Additionally, even though residents were repeatedly told of the importance of smoke-filled environments, 60% of the survey respondents marked that they thought that most people die from intense heat in a true fire situation. As Werfel (1998) writes "by age 75, the vital capacity of the lungs-the amount of air they can move with maximum inhalation and maximum exhalation-may be reduced by 50%." This statement of fact, compared to the aforementioned survey results, make it imperative that education efforts continue.

RECOMMENDATIONS

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This research project findings strongly suggest that an effort to educate and update the residents of Edgemont Towers and Fort Shelby continue. It also shows that the housing complex residents believe a sincere effort for resident protection has been undertaken by the Bristol, Tennessee Fire Department and the Bristol, Tennessee Housing Authority. While this is obviously a big stride, results show that the effort still needs to be more productive in terms of resident understanding and/or willingness to assist in their own protection in the event of an emergency. It is the absolute and unwavering feeling of the researcher that lessons learned from the John Sevier Center fire be constantly evaluated and reevaluated so that the tragedy of that Christmas Eve, 1989 never happens again. Additionally, it is recommended that the heroics of that cold December night be replaced, as completely as possible, with continued efforts in education and prevention, so that the need of that evening will never have to resurface.

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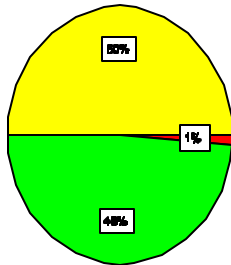
This survey is part of a research project that is being written to satisfy an assignment necessary for successful completion of Executive Development, year one of the National Fire Academy Executive Fire Officer Program. The National Fire Academy is located in Emmitsburg, Maryland. Please circle the answer that best describes your personal opinion in relation to the question asked. Your name is Not necessary. Thank you for your cooperation and your time.

- 1.) I always hear the fire alarm when it is sounded
agree disagree have no opinion
- 2.) I always assume that the alarm is practice, and not
actually a fire.
agree disagree have no opinion
- 3.) I feel that the housing authority and the fire
department have made a sincere effort to protect me
from a fire emergency.
agree disagree have no opinion
- 4.) I always leave the building when I hear the alarm.
agree disagree have no opinion
- 5.) I believe that the fire department will come and get
me if it is a real fire even if I stay in my room.
agree disagree have no opinion
- 6.) I believe that a true fire will never happen here.
agree disagree have no opinion
- 7.) I want to do everything I can to help myself to
safety if there is a fire emergency.
agree disagree have no opinion
- 8.) Most people die from the intense heat in a true fire
emergency.
agree disagree have no opinion

Thank you again for your help with this survey.

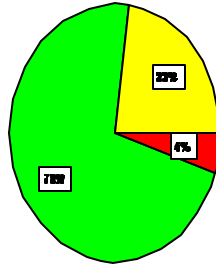
VARIABLE 1

Question 1 (Fire Alarm)



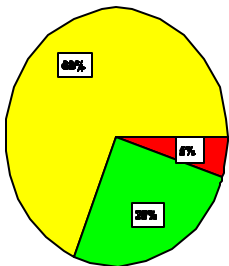
Agree Disagree
No Opinion

Question 2 (Practice Alarm)



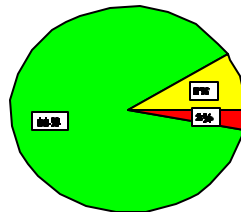
Agree Disagree
No Opinion

Question 4 (Hear Alarm)



Agree Disagree
No Opinion

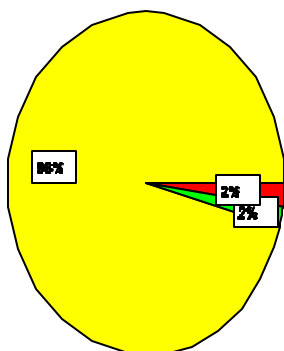
Question 6 (True Fire)



Agree Disagree
No Opinion

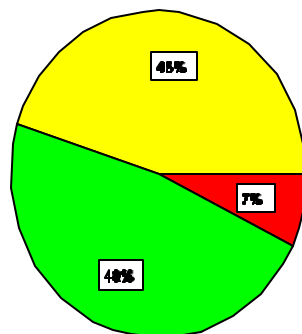
VARIABLE 2

Question 3 (Sincere Effort) Question 5 (FD will get me)



■ Agree
■ No Opinion

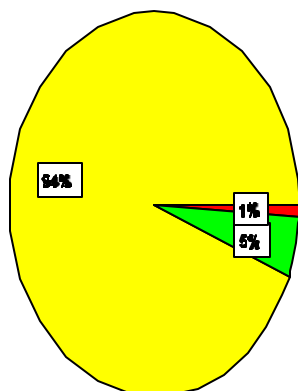
■ Disagree



■ Agree
■ No Opinion

■ Disagree

Question 7 (Help to Safety)



■ Agree
■ No Opinion

■ Disagree

Appendix 4

VARIABLE 3

Question 8 (People die from heat)

